

IN THE CLAIMS:

Please cancel Claims 1-20 and 38-45 without prejudice. Please add new Claims 21-37 and 46-49.

1 -20. (Cancelled)

21. (New) A method of manufacturing a semiconductor device, the method comprising:

forming a first layer of high thermal conductivity material on a back side of a semiconductor substrate;

forming a hole through the first layer of high thermal conductivity material and the semiconductor substrate;

forming a via in the hole;

forming a first device overlying the layer of high thermal conductivity material on the back side of the semiconductor substrate and in electrical connection with the via;

forming a second layer of high thermal conductivity material overlying the first device; and

forming a second device on a front side of the semiconductor substrate and in electrical connection with the via.

22. (New) The method of claim 21 further comprising:

coupling a thermal solution to the second layer of high thermal conductivity material.

23. (New) The method of claim 22 wherein the thermal solution comprises a heat sink and coupling the heat sink to the second layer of high thermal conductivity material comprises placing a layer of thermal interface material between the heat sink and the second layer of high thermal conductivity material.

24. (New) The method of claim 21 wherein forming the first device comprises:

forming an anode and a cathode, and the first device comprises a capacitor.

25. (New) The method of claim 24 wherein forming the anode and the cathode comprises:

fabricating the anode and the cathode to each have a plurality of fingers interlaced with fingers of the other.

26. (New) The method of claim 24 wherein forming the anode and the cathode comprises:
forming the anode as a plate and forming the cathode as a plate, one of the plates
overlying the other; and
forming a middle layer of high thermal conductivity material between the plates.
27. (New) The method of claim 21 wherein the high thermal conductivity material comprises
diamond.
28. (New) The method of claim 27 wherein forming the layers of diamond comprises
chemical vapor deposition.
29. (New) The method of claim 21 further comprising, after forming the second layer of high
thermal conductivity material and before forming the second device on the front side:
reducing a thickness of the semiconductor substrate.
30. (New) The method of claim 21 wherein:
forming the hole comprises forming a plurality of holes;
forming the via comprises forming a plurality of vias in respective holes; and
forming the first device comprises forming a plurality of devices in electrical connection
with respective subsets of the vias.
31. (New) The method of claim 21 wherein forming the first device comprises:
fabricating a spiral inductor.
32. (New) The method of claim 21 wherein forming the first device comprises:
fabricating a resistor.
33. (New) The method of claim 21 wherein the high thermal conductivity material has a
thermal conductivity greater than 150W/mK.
34. (New) The method of claim 33 wherein the high thermal conductivity material has a
thermal conductivity greater than 2000W/mK.
35. (New) The method of claim 33 wherein the high thermal conductivity material has an
electrical resistivity greater than 1E9Ω-cm.

36. (New) The method of claim 35 wherein the high thermal conductivity material has a thermal conductivity greater than 2000W/mK.

37. (New) The method of claim 36 wherein the high thermal conductivity material has an electrical resistivity greater than 1E15Ω-cm.

38 - 45. (Cancelled)

46. (New) An article of manufacture comprising:

a machine-accessible medium including data that, when accessed by a semiconductor fabrication factory, cause the semiconductor fabrication factory to perform the method of claim 21.

47. (New) The article of manufacture of claim 46 wherein the machine-accessible medium further includes data that cause the semiconductor fabrication factory to perform the method of claim 24.

48. (New) The article of manufacture of claim 47 wherein the machine-accessible medium comprises a recording medium.

49. (New) The article of manufacture of claim 47 wherein the machine-accessible medium comprises a carrier wave.